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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,211	05/30/2006	Reinhard Nesper	NESPER3	8476
1444 7590 07/08/2009 BROWDY AND NEIMARK, P.L.L.C. 624 NINTH STREET, NW SUITE 300 WASHINGTON, DC 20001-5303				
EXAMINER				
HAIN, TOBY				
ART UNIT		PAPER NUMBER		
4131				
MAIL DATE		DELIVERY MODE		
07/08/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/544,211

**Applicant(s)**

NESPER ET AL.

**Examiner**

TOBY D. HAIN

**Art Unit**

4131

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-22 is/are pending in the application.
- 4a) Of the above claim(s) 11-16 and 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10 and 17-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/08)  
Paper No(s)/Mail Date 5/31/2007
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claims Status***

1. US Application No. 10/544,211 contains 22 pending claims. Claims 11-16 and 20-22 are withdrawn from consideration, and claims 1-10 and 17-19, directed to a B/N/C/Si ceramic production process, are pending and subject to the instant first action on the merits.

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I in the reply filed on Jun. 12, 2009, is acknowledged. The traversal is on the ground(s) that unity of invention exists. This is not found persuasive because there is no contribution over the prior art by the common technical feature as established in the .

The requirement is still deemed proper and is therefore made FINAL.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
3. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

### ***Information Disclosure Statement***

4. The information disclosure statement (IDS) submitted on Aug. 2, 2005, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

#### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 5-8, 10, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 7,148,368 (issued Dec. 12, 2006) to Jansen *et al.*

9. Claim 1 is directed to a process of making a B/N/C/Si ceramic by the pyrolysis of B-tris(hydrosilylvinyl)borazine. Claim 5 limits claim 1 to applying the ceramic precursor to a substrate. Claim 6 limits claim 5 to the precursor being dissolved in a solvent and made thixotropic. Claim 7 limits claim 5 to the application as being painted or sprayed followed by pyrolysis. Claim 8 limits claim 1 to a range of pyrolysis temperatures. Claim 10 limits claim 1 to the borazine precursor being one-dimensionally or two-dimensionally crosslinked prior to the pyrolysis. Claim 17 limits claim 1 to coatings, and claim 19 limits claim 17 to interior coatings.

10. Jansen teaches the production of B/N/C/Si ceramic (Jansen, col. 1, lines 7-15; col. 5, lines 45-21) via multi-step pyrolysis that includes heating steps between 30°C-1000°C followed by secondarily heating at 1200°C-1600°C. (Jansen, col. 7, lines 60-67) Further, Jansen teaches that the structural motif produced in the ceramics includes crosslinked structures that contain linear domains or higher degrees of cross linking. (Jansen, col. 4, lines 55-68; col. 7, lines 28-35) Jansen's process includes production of borocarbosilazanes that are soluble and used in coatings such as dips before conversion into the B/N/C/Si ceramic by pyrolysis. (Jansen, col. 7, lines 37-45) One skilled in the art would recognize that if a hollow structure such as a pipe was dipped into the liquid before heating that the interior of the hollow item would be coated. Likewise, the liquid can be painted onto a surface or sprayed. (See US Patent No. Re. 36,573 to Barrow et al., col. 4, lines 38-45, teaching that ceramics are used as coatings that are sprayed onto surfaces including the interior of tubes.)

11. Jansen teaches at, col. 5, lines 13-42, silylalkylborazines of formula X. Given the permissible substitutions for  $R^1$ ,  $R^2$ , and  $R^3$  in Jansen's formula X, one skilled in the art of organic chemistry would reasonably predict that the supplied tris(hydrosilylvinyl) borazine would undergo pyrolysis in a similar manner as Jansen's silylalkylborazines. Allowing  $R^1 = R^2 = H$  and  $R^3 = \text{methyl or methylene}$  creates a borazine ceramic precursor that cross links into one- and higher-dimensional networks upon heating with substantially similar reaction products generated as a structure formed by pyrolyzing tris(hydrosilylvinyl)borazine.

12. One skilled in the art of organic chemistry, chemical engineering, or materials science at the time of Applicant's invention would readily anticipate the benefit of forming silico-containing borazine ceramics via Jansen's teachings. This process is efficient, cost-effective,

and easier than prior ceramic forming methods. Hence, claims 1, 5-8, 10, 17, and 19 are obvious in view of Jansen.

13. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansen as applied to claims 1, 5-8, 10, 17, and 19 above, in view of Krummland, (Dissertation, University of Hamburg, 2001), and further in view of US Patent No. 5,455,367 (issued Oct. 3, 1995) to Klein *et al.* and Haberecht *et al.*, DALTON TRANS., 2126-32 (2003).

14. Claim 2 limits claim 1 to making the borazine precursor from B-tris(trichlorosilylvinyl) borazine, and claim 3 limits claim 2 to making B-tris(trichlorosilylvinyl) borazine from B-triethynylborazine.

15. Although Jansen may not explicitly teach tris(hydrosilylvinyl)borazine, Krummland teaches the synthesis of B-tris(trichlorosilyl vinyl) borazine from B-triethynylborazine by hydrosilylation. (Krummland, Summary, para. 2) Additionally, Haberecht teaches the synthesis of B-tris(hydrosilylvinyl)borazine as well. (Haberecht, p. 2127.) Further, Klein provides a synthetic hydrogenation methodology whereby chlorinated silyl groups attached to unsaturated carbons are de-chlorinated.

16. One skilled in the art of organic chemistry at the time of Applicant's invention would readily anticipate the benefit of forming tris(hydrosilylvinyl) borazine from the Krummland and Haberecht procedures starting with B-triethynylborazine to produce B-tris(trichlorosilyl vinyl) followed by Klein's methodology to produce the desired tris(hydrosilylvinyl) borazine. The chemical practitioner would recognize that this material is readily and predictably transformed into B/N/C/Si ceramic via pyrolysis as per Jansen's teachings. This process is efficient, cost-

effective, and easier than prior ceramic forming methods. Hence, claims 2 and 3 are obvious in view of Jansen, Krummland, Haberecht, and Klein.

17. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansen as applied to claims 1, 5-8, 10, 17, and 19 above, in view of US Patent No. 5,188,757 (issued Feb. 23, 1993) to Paine *et al.*, and further in view of Haberecht as applied to claims 2 and 3 above.

18. Claim 9 limits claim 1 to metal dopants in the precursor. Claim 18 limits claim 17 to antistatic coatings.

19. Although Jansen may not explicitly teach doping the boron-containing species before pyrolysis, Paine teaches similar ceramic materials formed from compositions where dopants such as transition metals are introduced and interact with the borazine-containing starting material. (Paine, col. 9, lines 45-55) One skilled in the art recognizes that metals with available occupied and unoccupied d and f orbitals readily interact with  $\pi$  orbitals of aromatic species (borazine rings) and unsaturated organic moieties, e.g., vinylic domains, a view supported by Haberecht. (See Haberecht, p. 2131, § 3 Conclusion.)

20. One skilled in the art recognizes that ceramics are antistatic in nature: *either* they are insulating materials; they are doped so the ceramic matrix supports electrical conductivity as to leach surface charges; or they have conjugated networks that effectively support charge mobility.

21. Further, one skilled in the art of organic chemistry, chemical engineering, or materials science at the time of Applicant's invention would readily anticipate the benefit of using metal dopants as per Paine in coordination with the materials from Jansen to readily and predictably make B/N/C/Si ceramic via pyrolysis having antistatic properties. This process is efficient, cost-



effective, and easier than prior ceramic forming methods. Hence, claims 9 and 18 are obvious in view of Jansen and Paine.

### **Correspondence**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOBY D. HAIN whose telephone number is (571)270-1329. The examiner can normally be reached on Monday-Friday 7:30AM-5:00PM (except every other Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 571-272-0661. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TOBY D HAIN/  
Examiner, Art Unit 4131

**/James O. Wilson/  
Supervisory Patent Examiner, Art Unit 1624**